

### **REMARKS**

This paper responds to the Office Action dated November 7, 2007. The specification has been amended to move a figure embedded in the text and place it in the figures as FIG. 6. Claims 16-20, 34-38, 43-44, 46-48, 51, 57, 61, 65, and 68-70 are amended such that claims 1-73 are now pending in this application. Reconsideration of this application in view of the above amendments and the following remarks is requested.

#### **Claim Objections**

Claims 16-20, 34-38, 47, 48, 51, 57, 61, 65 and 68 were objected to because the term "ÿ" was recited. Claims 16-20, 34-38, 43-44, 46-48, 51, 57, 61, 65, and 68-70 have been amended to substitute the correct term "ß" for the term "ÿ".

#### **Provisional Double Patenting Rejection**

Claims 43-47 were provisionally rejected under a non-statutory obviousness-type double patenting rejection, specifically over claims 1-43 of co-pending U.S. Patent Application No. 10/524,155. Applicant does not admit that the claims are obvious in view of U.S. Patent Application No. 10/524,155. This rejection is provisional such that Applicant would like to await allowance of claims in the copending application to determine if this provisional rejection matures into an actual double patenting rejection. If in fact, the claims of the copending application are allowed and have not changed substantially such that the provisional double patenting rejection matures into a real double patenting rejection, applicant may provide a Terminal Disclaimer in compliance with 37 C.F.R. 1.321(b)(iv) to obviate these rejections.

#### **§103 Rejection of the Claims**

Claims 1-73 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Uhlinger (U.S. Patent No. 6,190,556), Lien (U.S. Patent No. 4,802,982) and/or Robbins (U.S. Patent No. 6,190,558). Applicant respectfully traverses the rejection because Applicant submits that not all of the elements are established by the cited references.

According to the MPEP § 2142 the prior art must teach or suggest all the claim limitations. The references cited by the Examiner simply do not describe a permeate carrier and first and second membranes as recited in the claims.

Claims 1-20

Claim 1 recites "...a permeate carrier having an H-value of about 0.045 atm-sec/gm or less, wherein the membrane device is capable of at least 50% MgSO<sub>4</sub> rejection of 500 ppm MgSO<sub>4</sub> in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F."

The Examiner states at page 4 of the Office Action that Lien "...teaches all these parameters and how to optimize these parameters (see columns 7-9, tables and working examples)." The Examiner further states at page 4 of the Office Action that it would be obvious to "...use the teachings of Lien '982 in the teaching of Uhlinger '556 to optimize the membrane device design of the desired performance."

Applicant respectfully traverses these assertions because Applicant submits that while Lien describes a number of generic formulae for optimizing a system under some different parameters, Lien does not describe a permeate carrier and first and second membranes as recited in the claims. Specifically, Lien fails to teach "...a permeate carrier having an H-value of about 0.045 atm-sec/gm or less, wherein the membrane device is capable of at least 50% MgSO<sub>4</sub> rejection of 500 ppm MgSO<sub>4</sub> in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F." Applicant notes that the examples in Lien is at various temperatures other than 77 degrees F.

Applicant submits that even if the values that are recited in claim 1 were used in the each of the generic formulae disclosed in Lien, there is no indication that the disclosed formulae would accurately apply values of claim 1. As an example, there is description where 65 psi is the applied pressure at 10 cm/s average feed channel cross-flow velocity in combination with the other values recited in claim 1.

Applicant also notes that the Examiner acknowledges at page 4 of the Office Action that the Uhlinger '556 reference fails to teach the recited H and  $\beta$  values. Therefore, the cited combination does not describe "...a permeate carrier having an H-value of about 0.045 atm-

sec/gm or less, wherein the membrane device is capable of at least 50% MgSO<sub>4</sub> rejection of 500 ppm MgSO<sub>4</sub> in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F” as recited in claim 1.

Claims 2-20 depend from claim 1 such that these claims incorporate all the limitations of claim 1. Therefore, the cited combination does not describe the subject matter of claims 2-20 for at least the reasons provided above with regard to claim 1.

Claims 21-73

As discussed above, Lien fails to describe a permeate carrier and first and second membranes as recited in the claims. In addition, Uhlinger does not disclose the relevant H and  $\beta$  values (as acknowledged by the Examiner).

Applicant notes that Uhlinger is relied on for a description of devices capable of salt rejection of greater than 50% and a membrane having an A value “...ranging from 10 to over 60 (converted from data of col 2 lines 1-10).” Applicant submits that even if the values that are recited in claims were used in each of the generic formulae disclosed in Lien, there is no indication that the disclosed formulae would accurately apply values of claim 21.

Applicant notes that it is Applicant’s specification and claims which provides the only description as to a permeate carrier and first and second membranes that include each of the variables which are recited in the claims. Therefore, the cited combination does not describe:

- (i) “...a first membrane sheet and a second membrane sheet separated by a permeate carrier having an H-value of 0.030 atm-sec/gm or less and a thickness of approximately 0.025 inches or less, wherein the membrane device is capable of at least 50% MgSO<sub>4</sub> rejection of 500 ppm MgSO<sub>4</sub> in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F” as recited in claim 21;
- (ii) “...a first membrane sheet and a second membrane sheet separated by a permeate carrier having an H-value of 0.070 atm-sec/gm or less and a thickness of approximately 0.015 inches or less, wherein the membrane device is capable of at least 50% MgSO<sub>4</sub> rejection of 500 ppmMgSO<sub>4</sub> in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F” as recited in claim 22;

- (iii) "...a first membrane sheet and a second membrane sheet separated by a permeate carrier having an H-value of 0.10 atm-sec/gm or less and a thickness of approximately 0.013 inches or less, wherein the membrane device is capable of at least 50% MgSO<sub>4</sub> rejection of 500 ppm MgSO<sub>4</sub> in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F" as recited in claim 23;
- (iv) "...a first membrane sheet and a second membrane sheet separated by a permeate carrier having an H-value of 0.05 atm-sec/gm or less and a thickness of approximately 0.021 inches or less, wherein the membrane device is capable of at least 50% MgSO<sub>4</sub> rejection of 500 ppmMgSO<sub>4</sub> in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F; as recited in claim 24;
- (v) "wherein the spiral wound membrane element has a diameter of approximately 2.0 inches or less and a length of approximately 12 inches or less, wherein the membrane element is adapted to have a permeate flow rate of at least 150 gallons per day when tested with 500 ppm NaCl in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F" as recited in claim 39;
- (vi) "wherein the membrane device has a length of approximately 20 inches or less, each of the membranes has an A-value of approximately 25 or greater, wherein the membrane device has a  $\beta$  value of at least about 0.60" as recited in claim 43;
- (vii) "wherein the membrane device has an outer diameter of approximately 2.0 inches or less and a length of approximately 12 inches or less, wherein the membrane device has a  $\beta$  value of at least about 0.90 and an A value of approximately 25 or greater" as recited in claim 46;
- (viii) "the one or more leaves having a total surface area of at least 350 square feet, wherein the element leaf length is greater than 42", wherein each of the membrane sheets has an A-value of approximately 25 or greater, and wherein the membrane element has a  $\beta$  value of at least 0.82 wherein the membrane device is capable of at least 50% MgSO<sub>4</sub> rejection of 500 ppm MgSO<sub>4</sub> in DI water at 65 psi at 10 cm/s average feed channel cross-flow velocity at 77 degrees F" as recited in claim 48;
- (ix) "the one or more leaves having a total surface area of between 60 to 125 square feet, wherein the element leaf length is greater than 42", wherein each of the membrane sheets

has an A-value of approximately 25 or greater; and wherein the membrane element has a  $\beta$  value of at least about 0.82 wherein the membrane device is capable of at least 50%  $\text{MgSO}_4$  rejection of 500 ppm  $\text{MgSO}_4$  in DI water at 65 psi at 10 cm/s average feed channel cross-flow velocity at 77 degrees F" as recited in claim 57;

- (x) "the membrane element having an outer diameter greater than 8", wherein the element leaf length is greater than 42", wherein each of the membrane sheets has an A-value of approximately 25 or greater; and wherein the membrane element has a  $\beta$  value of at least 0.82, wherein the membrane device is capable of at least 50%  $\text{MgSO}_4$  rejection of 500 ppm  $\text{MgSO}_4$  in DI water at 65 psi at 10 cm/s average feed channel cross-flow velocity at 77 degrees F" as recited in claim 65;
- (xi) "wherein the membrane element has a length of approximately 20 inches or less, the membrane has an A-value of approximately 25 or greater, wherein the leaf length is at least 8 feet, wherein the membrane element has a  $\beta$  value of at least 0.75" as recited in claim 69; and
- (xii) "wherein the membrane element has a length of approximately 20 inches or less, the membrane has an A-value of approximately 25 or greater, wherein each leaf length is at least 3.5 feet, wherein the membrane element has a  $\beta$  value of at least 0.75" as recited in claim 70.

Claims 25-38, 40-42, 44, 45, 47, 49-56, 58-64, 66-68 and 71-73 depend from respective independent claims 21, 39, 43, 46, 48, 57, 65 and 70 such that these claims incorporate all the limitations of claims 21, 39, 43, 46, 48, 57, 65 and 70. Therefore, the cited combination does not describe the subject matter of claims 25-38, 40-42, 44, 45, 47, 49-56, 58-64, 66-68 and 71-73 for at least the reasons provided above with regard to claims 21, 39, 43, 46, 48, 57, 65 and 70.

Applicant submits that while Lien describes a number of generic formulae for optimizing a system under some different parameters, Lien does not describe the thickness of the permeate carrier in combination with the other values that are recited in the claims. Applicant respectfully directs the Examiner's attention to claims 21-24 which recite with particularity the thickness of the permeate carrier.

Applicant further notes that while Lien describes a number of generic formulae for optimizing a system under some different parameters, Lien does not describe the leaf length of the membrane that is formed by the permeate carrier in combination with the other values that are recited in the claims. Applicant respectfully directs the Examiner's attention to claims 48, 57, 65, 69 and 70 which recite with particularity the leaf length of the membrane.

Reservation of Rights

In the interest of clarity and brevity, Applicant may not have equally addressed every assertion made in the Office Action, however, this does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

**CONCLUSION**

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6977 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 6 day of March 2008.

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